CLAIMS

What is claimed is:

| l | 1. A method for managing leased network addresses for a plurality of network | ks using |
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| 2 | overlapping address spaces, the method comprising the computer-implemented sta | eps of: |
| 3 | storing a plurality of banks of addresses corresponding to the plurality of n | etworks, |
| 4 | wherein at least one particular set of one or more network addresse | s is |
| 5 | included in more than one bank of the plurality of banks; | |
| 5 | receiving a request for a network address for a host on a first network of the | e plurality |
| 7 | of networks from a relay agent on an intermediate device connected | 1 to the first |
| 3 | network, the request including a qualifier associated with the first r | etwork by |
|) | the relay agent; | |
|) | based on the qualifier, selecting a first bank of addresses from the plurality | of banks; |
| l | identifying a first network address from the first bank of addresses based a | t least in |
| 2 | part on the request; and | |
| 3 | sending to the relay agent a response for the host, the response indicating t | he first |
| 1 | network address and the qualifier. | |
| | | |

- 1 2. A method as recited in Claim 1, wherein said step of storing the plurality of banks
- 2 further comprises the step of storing data indicating a value for the qualifier in association
- 3 with each bank of the plurality of banks.
- 1 3. A method as recited in Claim 1, wherein the qualifier further includes a segment
- 2 identifier of a segment of the first network.
- 1 4. A method as recited in Claim 3, wherein said step of identifying the first network
- 2 address from the first bank is further based on the segment identifier.
- 1 5. A method as recited in Claim 1, wherein the request is formatted according to a
- 2 dynamic host configuration protocol (DHCP)

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| 1 | 6. | A method as recited in Claim 5, wherein the qualifier is included in the request in a | |
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| 2 | set of | optional fields associated with the relay-agent in the DHCP. | |
| 1 | 7. | A method as recited in Claim 1, said step of sending the response further comprising | |
| 2 | the step of formatting the response according to a dynamic host configuration protocol | | |
| 3 | (DHC | P). | |
| 1 | 8. | A method as recited in Claim 7, wherein the qualifier is included in the response in a | |
| 2 | set of | optional fields associated with the relay-agent in the DHCP. | |
| 1 | 9. | A method as recited in Claim 1, wherein: | |
| 2 | | the request is to lease a new network address for the host; and | |
| 3 | | said step of identifying the first network address comprises selecting the first network | |
| 4 | | address from a pool of available network addresses in the first bank. | |
| 1 | 10. | A method as recited in Claim 1, wherein: | |
| 2 | | the request involves an already leased network address for the host; and | |
| 3 | | said step of identifying the first network address comprises retrieving the first network | |
| 4 | | address from a data structure of leased network addresses in the first bank. | |
| 1 | 11. | A method for managing leased network addresses for a plurality of networks using | |
| 2 | overla | pping address spaces, the method comprising the computer-implemented steps of: | |
| 3 | | receiving, at a relay agent executing on an intermediate device connected to a first | |
| 4 | | network of the plurality of networks, a first request for a network address from | |
| 5 | | a host on the first network; | |

sending to a configuration server a second request for a network address for the host,

associating a particular qualifier with the first network; and

the second request including the particular qualifier.

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| 1 | 12. | A method as recited in Claim 11, wherein: | |
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| 2 | | the intermediate device includes a plurality of interfaces connected to one or more | |
| 3 | | segments of one or more networks of the plurality of networks; | |
| 4 | | the method further comprises the step of storing a plurality of qualifiers corresponding | |
| 5 | | to the plurality of interfaces, each qualifier uniquely identifying one network | |
| 6 | | of the plurality of networks; and | |
| 7 | | said step of associating the particular qualifier with the first network further comprises | |
| 8 | | the step of retrieving the particular qualifier corresponding to a particular | |
| 9 | | interface connected to the host. | |
| 1 | 13. | A method as recited in Claim 12, wherein each qualifier includes a segment identifier | |
| 2 | uniquely identifying a segment of a network of the plurality of networks, the segment | | |
| 3 | conn | ected to a corresponding interface of the plurality of interfaces. | |
| 1 | 14. | A method as recited in Claim 11, wherein: | |
| 2 | | the host is on a particular segment of the first network; | |
| 3 | | the particular segment is connected to a particular interface of the intermediate device; and | |
| 5 | | the particular qualifier includes a segment identifier for the particular segment. | |
| 1 | 15. | A method as recited in Claim 11, wherein the first request is formatted according to a | |
| 2 | dyna | mic host configuration protocol (DHCP) | |
| 1 | 16. | A method as recited in Claim 11, said step of sending the second request further | |
| 2 | comprising the step of formatting the second request according to a dynamic host | | |
| 3 | confi | guration protocol (DHCP). | |
| 1 | 17. | A method as recited in Claim 16, wherein the qualifier is included in the second | |

request in a set of optional fields associated with the relay-agent in the DHCP.

| 1 | 18. | A method as recited in Claim 11, further comprising the steps of: |
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| 2 | | in response to sending the second request, receiving from the configuration server a |
| 3 | | first response, the first response indicating the particular qualifier and a |
| 4 | | particular network address for the host; |
| 5 . | | determining that the particular qualifier is associated with the first network; and |
| 6 | | sending a second response to the host on the first network, the second response |
| 7 | | including the particular network address. |
| 1 | 19. | A method as recited in Claim 18, wherein the second response does not include the |
| 2 | qualif | ier. |
| 1 | 20. | A method as recited in Claim 18, wherein the first response is formatted according to |
| 2 | a dyna | umic host configuration protocol (DHCP) |
| 1 | 21. | A method as recited in Claim 20, wherein the qualifier is included in the first response |
| 2 | in a se | t of optional fields associated with the relay-agent in the DHCP. |
| 1 | 22. | A method as recited in Claim 18, wherein: |
| 2 | | the host is on a particular segment of the first network; |
| 3 | | the particular segment is connected to a particular interface of the intermediate device; |
| 4 | | and |
| 5 | | the particular qualifier includes a segment identifier for the particular segment. |
| 1 | 23. | A method as recited in Claim 22 wherein: |
| 2 | | said step of determining that the particular qualifier is associated with the first |
| 3 | | network further comprises determining that the segment identifier is |
| 4 | | associated with the particular interface; and |
| 5 | | said step of sending the second response to the host comprises sending the second |
| 6 | | response through the particular interface. |

| 1 | 24. A computer-readable medium carrying one or more sequences of instructions for | | |
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| 2 | managing leased network addresses for a plurality of networks using overlapping address | | |
| 3 | spaces, which instructions, when executed by one or more processors, cause the one or more | | |
| 4 | processors to carry out the steps of: | | |
| 5 | storing a plurality of banks of addresses corresponding to the plurality of networks, | | |
| 6 | wherein at least one particular set of one or more network addresses is | | |
| 7 | included in more than one bank of the plurality of banks; | | |
| 8 | receiving a request for a network address for a host on a first network of the plurality | | |
| 9 | of networks from a relay agent on an intermediate device connected to the first | | |
| 10 | network, the request including a qualifier associated with the first network by | | |
| 11 | the relay agent; | | |
| 12 | based on the qualifier, selecting a first bank of addresses from the plurality of banks; | | |
| 13 | identifying a first network address from the first bank of addresses based at least in | | |
| 14 | part on the request; and | | |
| 15 | sending to the relay agent a response for the host, the response indicating the first | | |
| 16 | network address and the qualifier. | | |
| 1 | 25. A computer-readable medium carrying one or more sequences of instructions for | | |
| 2 | managing leased network addresses for a plurality of networks using overlapping address | | |
| 3 | spaces, which instructions, when executed by one or more processors, cause the one or more | | |
| 4 | processors to carry out the steps of: | | |
| 5 | receiving, at a relay agent executing on an intermediate device connected to a first | | |
| 6 | network of the plurality of networks, a first request for a network address from | | |
| 7 | a host on the first network; | | |
| 8 | associating a particular qualifier with the first network; and | | |
| 9 | sending to a configuration server a second request for a network address for the host, | | |
| 10 | the second request including the particular qualifier. | | |

| 1 | 26. | An apparatus for managing leased network addresses for a plurality of networks using |
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| 2 | overl | apping address spaces, comprising: |
| 3 | | a means for storing a plurality of banks of addresses corresponding to the plurality of |
| 4 | | networks, wherein at least one particular set of one or more network addresses |
| 5 | | is included in more than one bank of the plurality of banks; |
| 6 | | a means for receiving a request for a network address for a host on a first network of |
| 7 | | the plurality of networks from a relay agent on an intermediate device |
| 8 | | connected to the first network, the request including a qualifier associated with |
| 9 | | the first network by the relay agent; |
| 10 | | a means for selecting, based on the qualifier, a first bank of addresses from the |
| 11 | | plurality of banks; |
| 12 | | a means for identifying a first network address from the first bank of addresses based |
| 13 | | at least in part on the request; and |
| 14 | | a means for sending to the relay agent a response for the host, the response indicating |
| 15 | | the first network address and the qualifier. |
| 1 | 27. | An apparatus for managing leased network addresses for a plurality of networks using |
| 2 | overla | apping address spaces, comprising: |
| 3 | | a means for receiving, at a relay agent executing on an intermediate device connected |
| 4 | | to a first network of the plurality of networks, a first request for a network |
| 5 | | address from a host on the first network; |
| 6 | | a means for associating a particular qualifier with the first network; and |
| 7 | | a means for sending to a configuration server a second request for a network address |
| 8 | | for the host, the second request including the particular qualifier. |
| 1 | 28. | An apparatus for managing leased network addresses for a plurality of networks using |
| 2 | overla | pping address spaces, comprising: |
| 3 | | a network interface that is coupled to one or more intermediate devices connected to |
| 4 | | the plurality of networks; |
| 5 | | a processor; and |

| (| b | | one or more stored sequences of instructions which, when executed by the processor, |
|-------------|----------|---------|--|
| 7 | 7. | | cause the processor to carry out the steps of: |
| 8 | 8 | | storing a plurality of banks of addresses corresponding to the plurality of |
| g | 9 | | networks, wherein at least one particular set of one or more network |
| 10 | 0 | | addresses is included in more than one bank of the plurality of banks; |
| 11 | 1 | | receiving a request for a network address for a host on a first network of the |
| 12 | 2 | | plurality of networks from a relay agent on an intermediate device |
| 13 | 3 | | connected to the first network, the request including a qualifier |
| 14 | 4 | | associated with the first network by the relay agent; |
| 15 | 5 | | based on the qualifier, selecting a first bank of addresses from the plurality of |
| _ 1e | 5 | | banks; |
| 16 | 7 | | identifying a first network address from the first bank of addresses based at |
| <u>į</u> 18 | 3 | | least in part on the request; and |
| 19 | • | | sending to the relay agent a response for the host, the response indicating the |
| ₩ 20 |) | | first network address and the qualifier. |
| | | | |
| | 1 2 | 29. | An apparatus for managing leased network addresses for a plurality of networks using |
| E 2 | 2 (| overlaj | pping address spaces, comprising: |
| | 3 | | a first network interface that is coupled to a configuration server; |
| 2 | 4 | | a second network interface that is coupled to a segment of a first network of the |
| 5 | 5 | | plurality of networks |
| 6 | 5 | | a processor; and |
| 7 | 7 | | one or more stored sequences of instructions which, when executed by the processor, |
| 8 | 3 | | cause the processor to carry out the steps of: |
| ç |) | | receiving, at a relay agent, a first request for a network address from a host on |
| 10 |) | | the first network; |
| 11 | l | | associating a particular qualifier with the first network; and |
| 12 | 2 | | sending to the configuration server a second request for a network address for |
| 13 | 3 | | the host, the second request including the particular qualifier. |